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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/763,777

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Anuj B. Gosalia

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EXAMINER

AN, MENG AI T

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/763,777	<b>Applicant(s)</b> GOSALIA ET AL.	
	<b>Examiner</b> KWOK W. LEE	<b>Art Unit</b> 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-51,66,68-73 and 81-91 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-40 and 80-91 is/are allowed.
- 6) ☒ Claim(s) 41-43,45,48,50,51,66 and 69-73 is/are rejected.
- 7) ☒ Claim(s) 44,46,47,49 and 68 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2007 and 22 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/27/08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. Claims 15-51, 66, 68-73, and 81-91 are pending in this application.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 41-43, 45, 66, 69 and 70-72 are rejected under 35 U.S.C. 102(b) as being anticipated by Inoue (US 5,760,789).

4. As per claim 41, Inoue teaches the invention as claimed including an apparatus for supporting scheduling of tasks for processing by a coprocessor, comprising:

a central processing unit (CPU) (Column 10, lines 6-8);

a coprocessor (Column 10, lines 8-9);

one or more applications that generate tasks for processing by the coprocessor wherein the tasks are first stored in a user mode command buffer (Column 8, lines 50-58), and wherein said tasks are stored in a per-application context in said user mode command buffer (See figure 10 and Column 8, lines 59-63);

a scheduler process for determining an order in which the tasks are processed; wherein the order accounts for any relative priority among a first application relating to a

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first set of tasks and one or more other applications relating to additional tasks, and the order accounts for a corresponding amount of processing time that the first application and one or more other applications are entitled to (Column 12, lines 5-17).

5. As per claims 42 and 71, Inoue teaches the invention as claimed including wherein the coprocessor is a GPU (Column 10, lines 8-9).

6. As per claim 43, Inoue teaches the invention as claimed including wherein the coprocessor supports interruption during the processing of a task by automatically saving task information to a coprocessor-accessible memory location (Column 8, lines 59-67, column 9, lines 1-14 and Column 12, line 24-29).

7. As per claim 45, Inoue teaches the invention as claimed including wherein the coprocessor is capable of storing information regarding the history of coprocessor switches from task to task in a specified system memory location readable by the scheduler process (Column 8, lines 59-67, column 9, lines 1-14 and Column 12, line 24-29).

8. As per claim 66, Inoue teaches the invention as claimed including a coprocessor (Column 10, lines 8-9) for use in connection with a coprocessing scheduler (Column 12, lines 5-17), comprising:

a coprocessor for processing tasks that are initially gathered in a user mode command buffer memory group(Column 8, lines 50-58), wherein said tasks are stored in a per-application context in said user mode command buffer (See figure 10 and Column 8, lines 59-63), and wherein said tasks are submitted to the coprocessor by a scheduler process that submits tasks to the coprocessor according to a priority of applications relating to said tasks and that request processing of the tasks, and wherein the priority determines the amount of coprocessor time one or more applications are entitled to (Column 12, lines 5-17).

9. As per claim 69, Inoue teaches the invention as claimed including wherein the coprocessor processes tasks from a run list by switching immediately to a subsequent task on the run list when a switching event occurs (Column 9, lines 1-14).

10. As per claim 70, Inoue teaches the invention as claimed including wherein a switching event comprises at least one of a completion of processing a previously submitted task (Column 12, lines 24-29), a page fault in processing a task, a general protection fault in processing a task, and a request by a central processing unit (CPU) to switch to a new run list.

11. As per claim 72, Inoue teaches the invention as claimed including wherein the coprocessor accesses memory resources in a coprocessor-readable memory by a memory manager (Column 9, lines 45-65).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 48, 51 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (US 5,760,789).

14. As per claim 48, Inoue does not teach wherein the coprocessor specifies a write pointer for indicating where in the system memory location the coprocessor should write to next.

15. It was well-known in the art that in order to write to memory, one needs to specify a location in memory to write to by creating a pointer to that memory location and it would have been obvious to do so.

16. As per claim 51, Inoue teaches context switching between input hardware queue tasks and client tasks (Column 9, lines 1-14).

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17. Inoue does not teach wherein the coprocessor supports enable/disable context switching instructions such that when context switching is disabled, the coprocessor will not switch away from a current coprocessor task.

18. It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have enabled and disabled context switching if input hardware tasks were not high priority tasks, and where all the tasks of one particular source, i.e. Client 1, Client 2, Input Hardware, were allowed to be executed until completion.

19. As per claim 73, Inoue does not teach wherein the memory resources comprise references to virtual memory addresses.

20. It was well known in the art that buffer memory is virtual memory and therefore it would have been obvious that the memory resources are referenced to virtual memory addresses when accessed.

21. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (US 5,760,789) in view of Magar et al (US 4,713,748).

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22. As per claim 50, Inoue does not teach wherein the coprocessor supports trap instructions that are capable of generating a CPU interrupt when processed by the coprocessor.

23. The Magar et al reference teaches a microprocessor with a trap instruction that acts as a software interrupt to transfer program control to another program memory location.

24. It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have added a trap instruction, serving as a software interrupt, to handle the input hardware queue tasks of Inoue at the graphics processor instead of having to check for input hardware queue instructions periodically at the queue buffer/server queue. This would further improve hardware input response and simplify the "Dispatch" routine.

### ***Allowable Subject Matter***

Claims 44, 46, 47, 49 and 68 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 15-40 and 80-91 are allowable.



***Response to Arguments***

Applicant's arguments with respect to claims 41-43, 45, 48, 50, and 51 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KWOK W. LEE whose telephone number is (571)270-3557. The examiner can normally be reached on Mon - Thu and alternate Fridays 7:30-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. W. L./  
Examiner, Art Unit 2195

/Meng-Ai An/  
Supervisory Patent Examiner, Art  
Unit 2195